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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/019,618	12/20/2001	Andreas Kramer	PP/1-22042/A/CGM 499/PCT	1679

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CIBA SPECIALTY CHEMICALS CORPORATION
PATENT DEPARTMENT
540 WHITE PLAINS RD
P O BOX 2005
TARRYTOWN, NY 10591-9005

EXAMINER

TESKIN, FRED M

ART UNIT	PAPER NUMBER
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1713

DATE MAILED: 02/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/019,618

Applicant(s)

KRAMER ET AL.

Examiner

TESKIN

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17, 19-25, 27 and 28 is/are pending in the application.
- 4a) Of the above claim(s) 8, 9, 13-16, 27 and 28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6 and 10-12, 17 and 19-25 is/are rejected.
- 7) ☒ Claim(s) 5 and 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 05/07/02.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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Applicants' election "with traverse", in paper no. 10, of compound 105 of Example A5, found on pages 39 and 45 of the specification, as a single disclosed species is acknowledged. Because applicants did not distinctly and specifically point the supposed errors in the restriction requirement, the election is treated as an election without traverse (see MPEP 818.03(a)).

Claims 8, 9, 13-16, 27 and 28 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to non-elected species. Election was made **without** traverse in paper no. 11.

No prior art having been found that anticipates or renders obvious the elected species of compound, the prior art search has been extended to cover non-elected species within the scope of the Markush-type claims under examination.

This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

The disclosure is objected to because of the following informalities:

On page 5, (i) fifth line from the end, "hydrogen" is incorrectly listed as an example of "aromatic or aliphathic (sic., aliphatic) substituent" and (ii) in the penultimate line, the expression "bzw." is not understood.

Appropriate correction of the specification is required.

Claims 19 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(A) Claim 19 is indefinite due to improper Markush language in the recitation "the ethylenically unsaturated monomer is selected from the group consisting of ethylene ... or vinylidene halides." Either "selected from the group consisting of ... and ..." or "wherein the ethylenically unsaturated monomer is ethylene ... or vinylidene halides" is proper; see MPEP 2173.05(h).

(B) Claim 24 provides the limitation to "the compound of formula ... (IV), (V), (VI) or (VII)". There is no proper antecedent basis for this limitation in the claims. Neither claim 24 nor parent claims 20/1 present compounds identified as formula (IV), (V), (VI) or (VII). Appropriate correction is required.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 6, 10, 11, 17 and 19-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Li et al (*Polymer Preprints*, **39**(2), 1998, pp. 598-599)("Li I") or Li et al (*Polymer Preprints*, **40**(1), 1999, pp. 383-384)("Li II").

The cited articles each describe the preparation of initiators containing a latent nitroxyl group and a masked phenolic hydroxyl group and their use in the preparation of two-block (Li I) and three-block copolymers (Li II) of polystyrene and polycarbonate. Attention is directed to initiators ACEBTM (Li I, page 598, top of second column) and II (Li II, page 383, top of second column), which compounds correspond to applicants' formula (I) as claimed when the subscript $n = 1$, variable A is 2,2,4,4-tetramethylpiperidinyloxy and Q_1 is an organic radical derived from a monocarboxylic acid derivative, as provided for in claims 2 and 6. Initiators ACEBTM and II also meet the limitations of claim 3 insofar as R_1 and R_2 may be selected from hydrogen and methyl, and of claims 10-11, which are readable on 2,2,4,4-tetramethylpiperidinyloxy as a species of group A in claim formula (I).

As to claims 17 and 19-25, note the formation of reaction mixtures of initiator ACEBTM or initiator II and styrene for conducting nitroxyl-mediated radical polymerization (NMRP) of styrene under conditions within the recitations of claims 20-22; e.g., O-C bond scission by heating to 140°C (Li I, Figures 3 and 4) or 117°C (Li II, page 383, third paragraph of left-hand column). The described reaction mixtures qualify as polymerizable compositions within claims 17 and 19. Li II further reports NMRP of styrene using initiator II at a concentration of 64 mmol or 0.064 mol, a quantity well within the concentration range of claim 24.

As such, Li I and Li II are seen to meet all the essential limitations of claims 1-4, 6, 10, 11, 17 and 19-25.

Claims 1-4, 6, 10 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Dao et al (*J. of Polym. Sci.: Pt. A: Polymer Chemistry*, **36**(12), 1998, pp. 2161-2167)("Dao").

Dao describes methodology for synthesizing a wide variety of functionalized alkoxyamines for use as initiators of living free radical polymerization. In Table I, Dao describes the chemical structures of products made by reacting various alkoxyamines with various functionalized styrene substrates according to methodology detailed on page 2162. Of the described products, compounds 7e, 7i, 7j, 7k, 7l and 7n are seen to correspond to claim formulae (I) or (III) when subscript $n = 1$, A is a cyclic or open chain nitroxyl radical and Q_1 is an organic radical derived from a monofunctional alkylating agent (*cf.*, 7e, 7i, 7k, 7l, 7n) or from a monocarboxylic acid derivative (*cf.*, 7j). Furthermore, said compounds contain cyclic (7e, 7i, 7j, 7k, 7l) or open chain (7n) nitroxyl groups which are species of "group A" as defined in claims 10-11.

Claims 12, 17, 19-21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dao et al ("Dao").

Claim 12 is drawn to a compound of formula (I) or (II) according to claim 11, wherein A is a group defined by, e.g., formula (XXXA), among other formulae. Formula (XXXA) is generic to a 4-hydroxy substituted 2,2,4,4-tetramethylpiperidinyloxy group.

Compound 7e of Dao (page 2163, Table 1) differs from formula (I) of claim 12 only in that the 2,2,4,4-tetramethylpiperidinyloxy substituent lacks a functional group at the 4-position. However, Dao shows that an alkoxyamine product containing a 4-hydroxy substituent may be prepared from a hydroxy-functionalized styrene substrate (see substrate 5o). Compound 7e is derived from substrate 5e, a methoxy functionalized styrene substrate. Given the close chemical and structural relationship of these substrates, one would have reasonably expected either to react analogously with the corresponding hydroxy-functionalized nitroxyl radical to yield the desired alkoxyamine product. Accordingly, it would have been obvious to one having ordinary skill in the art to modify Dao by substituting a 4-hydroxy-2,2,4,4-tetramethylpiperidinyloxy radical for the corresponding non-functionalized radical in the reaction leading to compound 7e, with a reasonable expectation of obtaining a functionalized alkoxyamine suitable for preparing hydroxy-functionalized polymers.

With respect to claims 17, 19-21 and 25, it would have been obvious to one having ordinary skill in the art to combine any of Dao compounds 7e, 7i, 7j, 7k, 7l and 7n with an ethylenically unsaturated monomer and then subject the monomer to free radical polymerization since (1) all of the alkoxyamines derivatives prepared by Dao are said to be "highly efficient in controlling polymer structure and provide a facile route to chain end functionalized polymers" and (2) polymerization of 7k (a compound within claim formula (III)) with alpha-olefins is said to give alkoxyamine functionalized poly(olefin). (See Dao at page 2162, right-hand column.) To promote such polymerization by using heat to effect O-C bond scission, per claim 21, would have

been obvious, as an elevated temperature condition is commonly employed in the prior art to generate free radicals from an alkoxyamine based initiator when seeking to polymerize olefinic monomers.

Claims 1, 3, 10, 11, 17, 19-22 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Sugimoto et al (*Polymer Preprints*, **40**(1), 1999, pages 111-112)("Sugimoto").

TEMPO-based initiators 1 and 2 of Sugimoto (see page 111, left-hand column) are seen to correspond to claim formulae (I) when subscript $n = 1$, A is a cyclic or open chain nitroxyl radical and Q_1 is an organic radical derived from glucose or maltose. Said initiators also meet the limitations of claim 3 insofar as R_1 and R_2 may be selected from hydrogen and methyl, and of claims 10-11, which are readable on 2,2,4,4-tetramethylpiperidinyloxy as a species of group A in claim formula (I).

As to claims 17 and 19-22, 24 and 25, note the formation of reaction mixtures of initiator 1 and 2 and styrene for conducting nitroxyl-mediated radical polymerization of styrene under conditions within the recitations of claims 20-22; e.g., O-C bond scission by heating to 120°C (page 111, final three paragraphs of right-hand column). The described reaction mixtures qualify as polymerizable compositions within claims 17 and 19.

Claims 1-4, 6, 10, 11, 17, 19, 20-22 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Miura et al (*Macromolecules*, **31**(14), 1998, pages 4659-4661)("Miura").

Miura describes alkoxyamine initiators corresponding to applicants' formula (I) or (II) as claimed when subscript $n = 1$, variable A is 2,2,4,4-tetramethylpiperidinyloxy and Q_1 is an organic radical derived from a monofunctional alkylating agent or a monocarboxylic acid derivative, as provided for in claims 2 and 6. See compounds 3e and 3f on page 4659, right-hand column. Said compounds also meet the limitations of claim 3 insofar as R_1 and R_2 may be selected from hydrogen and methyl, and of claims 10-11, which are readable on 2,2,4,4-tetramethylpiperidinyloxy as a species of group A in claim formula (I).

As to claims 17, 19, 20-22 and 25, note the formation of reaction mixtures of alkoxyamines 3e and 3f and styrene for conducting bulk polymerization of styrene under conditions within the recitations of claims 20-22; e.g., O-C bond scission by heating to 120°C (page 4660, Table 1 and final full paragraph in right-hand column). The described mixtures of styrene and alkoxyamine initiator qualify as polymerizable compositions within claims 17 and 19. Moreover, these initiators were used at a concentration of 20.0 mmol or 0.020 mol, a quantity well within the concentration range of claim 24, to prepare "polymer" within the scope of claim 25. (*Id.*, Table 1, footnote b.)

As such, Miura is seen to meet all the essential limitations of claims 1-4, 6, 10, 11, 17, 19, 20-22 and 25.

The prior art made of record and not relied upon is considered pertinent to applicants' disclosure.

Fujita et al is cited to show the use of 2,2,4,4-tetramethylpiperidinyloxy as free radical scavenger in the free radical polymerization of styrene. Matyjaszewski et al is cited to show a method of rate enhancement of nitroxyl radical-mediated polymerization employing a radical initiator with a long half-life at the reaction temperature and a compound of defined formula (I).

Claims 5 and 7 are objected to as being dependent on a rejected base claim but would be allowable if rewritten in independent form to include all the limitations of the base claim and any intervening claim. Examiner has not, as of the date of this Office action, located or identified any prior art document(s) that can be used to render the compound defined by said claims anticipated or obvious to a person of ordinary skill in the art.

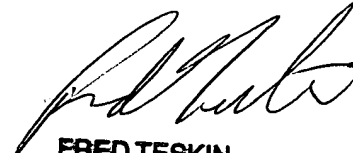
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner F. M. Teskin whose telephone number is (571) 272-1116. The examiner can normally be reached on Monday through Thursday from 7:00 AM - 4:30 PM, and can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The appropriate fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

FMTeskin/01-17-04



FRED TESKIN
PRIMARY EXAMINER
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